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L'ASSOCIATION CANADIENNE DES GEOGRAPHES

THE CANADIAN ASSOCIATION OF GEOGRAPHERS: A SKETCH OF THE PRELIMINARIES

by

J.W. Watson

Interim President of the Association, 1950-51

Sooner or later every group of professional people, seeking recognition for their craft or simply anxious to benefit from each others' experience, desires to draw together at regular intervals and to form an association.

To geographers in Canada this idea was very remote in the early days (that is, in the thirties) because there were so few geographers. It would have been an impudence for any group to call themselves more than a Committee. And in fact the National Committee of the International Geographical Union was probably the first form of geographical association of a serious kind. Yet it contained many more non-geographers than geographers. Taylor, Brouillette and Pleva were the only geographers on the Committee. It was felt by most that, rather than start a weak organization, it would be better to join a good one like the Association of American Geographers where one could make a real contribution to the advancement of geography and from which one could receive so much in return. Consequently, most of us went south every year to the A.A.G. meetings where, I must say, we were made very welcome.

I believe the first attempt at a Canadian association was when Professor Griffith Taylor tried to induce the Royal Society of Canada to start a geographical section, but his efforts did not meet with any success. He was made a Fellow of the Society but was expected to join the section on the Geological Sciences, which he did. From time to time he used this position to introduce geographical papers by other geographers into the programme but as long as geographers could not have their own section this was not a very satisfactory way of advancing their research.

Dr. Taylor also tried to use his influence with the Canadian Geographical Society to make it more interested in serious, professional geography. But the nature and aims of that Society were, quite properly, to further popular geography and not the scientific and academic studies of practising geographers. The usual difference, such as exists between the Institute of British Geographers and the Royal Geographical Society or the Association of American Geographers and the National Geographic Society, was found to occur between the roles of the professional association and the popular society in Canada.

Next, several of us were fortunate enough to be asked to serve on the Canadian Social Science Research Council, because the Council felt that geography needed some encouragement; but this did not solve the problem of a general forum. Through it, however, contacts were made both with the Canadian Historical Association and the Canadian Political Science Association, to whose councils some geographers were elected and where we were welcome to submit geographical papers.

While to do this made other academic disciplines aware of our existence and built up a friendly series of relationships with historians and economists, many of whom had written in a very geographical way about Canada, it did not establish Geography itself. Consequently those of us in Ontario, at least, threw ourselves behind the Geography Section of the Ontario Educational Association, and much important work was done in the early years of that organization.

In the middle forties, in addition to the geography departments at Toronto, McMaster and Western Ontario and at the School of Higher Commercial Studies in Montreal, departments of geography were opened at the University of British Columbia, the University of Montreal, McGill and at Laval. There was a feeling that university geographers might do well to get together, and occasional discussions to this effect took place, although they bore no fruit.

The post-war expansion in Geography, with the opening up of posts for geographers in municipal, provincial and federal governments and the establishment of new university departments, as at Manitoba, and a considerable growth in the older ones, encouraged us to think that the time was ripe for association. During the summer of 1949, when several senior university geographers were in Ottawa, it was agreed that the matter should be sounded out. Representatives of Toronto, McMaster and McGill Universities and of the Geographical Branch being at these initial discussions, it was assumed that the institutions concerned would themselves support the idea. Discussions were then opened with other Geography centres.

The next summer I received a letter from Mr. South of Vancouver to say that the west coast geographers had recently banded together with such profit that he invited us to entertain the suggestion of a national association.

This parallel movement in the West coming as it did so soon after serious discussions had begun in the East, encouraged us to go forward with the organization of a national association. The western group was asked to nominate a representative at a preliminary meeting in Ottawa and Dr. Robinson was chosen to express their views.

On August 29, 1950, a number of geographers then serving with the Geographical Branch but at the same time representative of the Universities of Montreal, McGill, McMaster, Toronto, Western Ontario and British Columbia, held a meeting at which they indicated the probable support of their various institutions for the proposed association.

They drew up a provisional constitution and nominated a provisional executive consisting of J.W. Watson as interim President, P. Camu as interim Secretary and B. Zaborski, G. Tatham and J.L. Robinson as Counsellors.

This executive then set about preparing for a meeting at which university, school and government geographers might organize themselves, in a formal way, into a Canadian Association of Geographers. It was decided to hold the meeting along with the other Learned Societies at the annual meeting of the Royal Society of Canada. This is also the occasion when the Universities' Conference and the Canadian Social Science Research Council meet. A letter was sent to the then president of the Royal Society asking for his support of the inclusion of the proposed Association as one of the Learned Societies. He wisely pointed out he was not in a position to do this. Each association must earn its own right to that standing or title in the community of the arts and sciences -- a salutary warning for the new organization! However, his secretary gave us a place at the annual gathering of these Societies, in any case.

Letters were sent by the interim President and Secretary inviting geographers and those interested in Geography to attend at the Meeting of Establishment on May 30, 1951. These letters included both the original provisional constitution and individual or group amendments that had been called for. The various suggestions were pooled at the organizational meeting held at McGill University, a preliminary constitution was approved and a formal Executive was nominated, with Professor Griffith Taylor as the Honorary President and Professor Putnam as the President.

The outcome of this meeting showed that (a) there were more than enough geographers in Canada to support a Canadian association, (b) that the principal object of associating together was to present and hear serious papers on geography and meet fellow geographers.

THE CANADIAN ASSOCIATION OF GEOGRAPHERS: PROCEEDINGS OF THE FIRST ANNUAL MEETING

by

P. Camu,

Secretary of the Association.

The First Annual Meeting of the Canadian Association of Geographers was held in Montreal, at McGill University on 30-31st May, 1951.

The general business meeting of 30th May was devoted entirely to the formal creation of the Association, the election of officers and other business. A few items of the provisional constitution were adopted only, leaving to a sub-committee the task of preparing the final draft of the constitution. Among these items, the name of the Association was adopted. The objectives of the Association were defined as follows: "The objectives of this Association shall be to promote the use and development of geography in Canada by facilitating an exchange of ideas between geographers, by arranging meetings where geographers can discuss the several aspects of geography and its related fields and by publishing information and professional papers of interest to geographers in Canada. The Association will also assist in stimulating, guiding, influencing and encouraging geographical research, exploration and the teaching of geography in Canada and strive for the improvement of its status in Canadian education. It will provide direction for geography graduates to new fields of geographical employment."

Several categories of members were formed: full members, associate members, student members, benefactors and life members. Finally a new executive committee was elected, which in turn selected members of sub-committees.

The Executive Committee for the year 1951-1952:

Honorary-President:	Griffith Taylor
President:	D.F. Putnam
1st Vice-President:	P. Dagenais
2nd Vice-President	J.L. Robinson
Secretary-Treasurer:	P. Camu
Councillors:	P. Biays
	F.K. Hare
	E.G. Pleva
	L. Reeds
	T. Weir

Sub-Committees: (the first name is the name of the chairman, the others are members of the committee)

Constitution Committee:	G. Tatham, J.B. Bird, B. Brouillette, D.F. Putnam.
Membership Committee:	J.W. Watson, G. Aumont, F.K. Hare, D. Kerr.
Nomination Committee:	J.R. Mackay, R.T. Gajda, L. Reeds.
Publications Committee:	B. Zaborski, P. Dagenais, N.L. Nicholson, P. Uren.
Convention Committee:	According to locality (in 1951, F.K. Hare and J.B. Bird).

The second part of the meeting was devoted to papers. Eight papers were presented, the details of which occupy the major part of this volume.

On the evening of 30th May, a cocktail party was given by the University of Montreal to members of the Association, after a visit to the main building.

The next day, after a visit to the harbour of Montreal in a National Harbours Commission ship, Professor Hare of McGill University lead a geographical excursion in the region south and east of Montreal which included stop-overs at Lachine Rapids, the village of Laprairie, Fort Chambly, the Richelieu River and Mount St. Hilaire.

GEOGRAPHY IN EDUCATION

by

J.W. Hamilton, B.A.,

Macdonald College, McGill University

It is significant that one of the purposes of this professional organization is to promote geography in education and it is therefore appropriate for us to remind ourselves of the reasons why we, as professional geographers, should be concerned with geography teaching in the elementary and secondary schools.

As geographers we are quite aware of the significance of geography in world affairs. The average Canadian is not, for to him geography still means physiography, capes and bays, chief cities, exports and imports. Professor Neville Scarf, Dean of the Faculty of Education, University of Manitoba, quotes Dr. Renner as saying, "These errors in thinking about geography (have) resulted in a general neglect of that field (in geography) in education and caused American educators to place an over-emphasis upon history and institutional social sciences, which in their turn have given education in the United States its peculiar bias which renders so many educated Americans singularly inept in dealing with geopolitical, geoeconomic and geocultural problems". This statement may be applied to the Canadian scene as well. Dr. Stamp, in his recent survey of the status of geography in education in Canada, found that there is a large blind spot in our educational system at the secondary school level, in every province.[1]

The majority of our public men have received and will continue to receive their education in the public schools of our land. The future public servant and national leader cannot be picked out from amongst his classmates while he is in school. We must strive to make our general education courses adequate for future world and national leaders as well as for the average citizen. If Canada is to maintain and improve her position in the association of nations, her leaders must receive good geographical training in the elementary and secondary schools, since many of them will not study geography at the university level.

Our universities are handicapped at present by the lack of geographical knowledge of high school graduates, as a result of the deficiency which Dr. Stamp noted. Better geographical training in the secondary schools would mean greater understanding on the part of the student; and more time devoted to professional training on the part of the universities.

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[1] Stamp, L.D. Geography in Canadian Universities, Ottawa, Canadian Social Science Research Council, 1951.

We as professional geographers must be concerned with geography in the elementary and secondary schools, because here the foundation of knowledge is built for the average Canadian, for our politicians and statesmen, and for our potential geography students. As Canadian citizens, we must be concerned with the use of our discipline as part of our culture which must be passed on to succeeding generations.

It follows that our next concern is with the kind of geography that should be taught in the elementary and secondary schools.

I feel that geography in the elementary school should be descriptive. That definition of geography which says that it is a study of man in relation to his environment gives the cue for the approach to geography in the school. Man must be the focal point of the study.

Pupils learn best through experience. Where actual experience is lacking, learning is effective by comparison with similar experience, or by vicarious experience. In order that the child may understand man in relation to his environment, he must first understand his own relationship to his immediate environment. I feel that the primary grades should make the child aware of his home, school, and church, and their relationship, spatial and cultural, to one another so that he can begin to understand that people in the home, school and community help one another and are interdependent. A study of "community helpers" will emphasize this. Field trips to a local bakery, grocery store, or housing development will awaken the school child's interest in how people help one another, where we get our food, clothing, material for making houses, and so on. He begins to see that his community is linked with others.

Since grade four is transitional between primary and elementary grades it is my opinion that it should be used to introduce the pupil to various environments of contrasting types because he is interested in people in other lands and his imagination is developing. Simple man-land relationships may be discussed from a descriptive point of view, with an emphasis upon a sympathetic understanding of how people live in different environments. A description of homes, food and clothing will bring out the simple geographical relationships which are understood by the pupils at this age level. The community being studied should be constantly compared to the community which the child knows best, that is, his own.

It is important to realize that power to reason about abstract things just begins to develop in the twelve-year old. It is therefore unwise to try to develop geographical principles, such as the factors which influence weather, in the elementary grades. Many elementary school pupils can recite an explanation for the monsoons, but it is very doubtful that any understand it, since this requires an understanding of convection currents which is not undertaken until the high school science courses. It would be much better to teach the descriptive geography of Indian irrigation schemes in the time taken to drill the former explanation. When the pupil receives his instruction in the physics laboratory, preferably by experiment, then he can

easily grasp this application of his learning. Thus we have learning through understanding, in place of meaningless parrotting. The elementary grades therefore should be concerned with the descriptive geography of Canada and some of the major countries of the world, to bring out international interdependence, and to build international understanding.

It must be remembered that many pupils leave school upon completing the elementary grades. They will become fully recognized citizens of our democracy entitled to vote and to take their place in the community. It is important therefore to complete a course in the elementary grades which will give those who leave school an understanding of the way of life of people in other countries and a sympathetic understanding of how people in various parts of the world depend upon one another. It must also be recognized that in many provinces the training in geography is largely discontinued at the end of the elementary grades.

The secondary school grades may be divided into two groups which may be called for convenience Junior and Senior High School, the reason for the division being that many more pupils leave school at the end of Grade X. Educators desire to provide a complete course for these people and then have another course for the academic pupils who may continue on to university. In Canada, geography courses in the Senior High School grades is extremely rare, and where offered are usually an option for the poorer pupils who cannot handle mathematics, science, or a language.

In my opinion, geography in the Junior High School grades should be largely a study of regional and human geography of important world areas so as to give a better understanding of world affairs and to act as a basis for a final course in the Senior grades in Commercial geography which will develop a world picture based upon the study of man's use of the land.

Some geographers advocate systematic studies in the Secondary schools as a basis for college training. Rather, I believe, the university is the place for such studies. World climate and world distribution patterns such as vegetation should be learned through understanding the principles involved and such understandings are better grasped at the college level. Memorization is not what is required, and the pupils time can be more profitably employed by developing an appreciation of how man lives in various specific environments, or in studying the geography behind current events.

Many provinces in Canada have a social studies course which claims to combine the teaching of history and geography. I believe in correlating history and geography, and science and music and art, but I find it difficult to conceive of a combined course which can do justice to the individual disciplines involved. Teachers as a rule find it difficult to do justice to combined courses. Specialists in various fields correlate subject matter, but find fusion difficult or impossible, yet teachers are expected to handle the situation deftly.

Such a programme implies that adequate facilities exist throughout Canada for good geography teaching. Unfortunately this is not so. Geography teaching suffers from several major handicaps not the least of which is the poor geographical background of many teachers. Many teachers have not studied geography since they were in elementary grades themselves, and the time allotment in teacher-training institutions (where one year courses are the rule) is, to me, pitifully inadequate. Schools will not offer geography as an option except for poorer students, because of the lack of qualified teachers and because few universities recognize geography as an entrance requirement on a par with other subjects. Then geography graduates do not enter the teaching profession because of the lack of jobs as geography specialists.

Another difficulty is the lack of good teaching materials and adequate supplies.

Very frequently text-books are not suitable for the presentation of good geography, and suitable up-to-date information is difficult to get. Geography requires the use of special materials and techniques, and should have a room equipped especially to meet its needs. It is largely a laboratory subject and should be taught as such, with pupils making models, maps and diagrams to illustrate the principles involved.

What then can members of the Canadian Association of Geographers do to improve the geography teaching in schools?

I feel that we can work with teachers associations in each of the provinces to gain more recognition for our discipline.

Some of our members have already written or co-authored text-books for school use. It is important that school geography texts be written by geographers and teachers in order to avoid "scrap-book" geographies.

Many of our members could write articles of interest about Canada and various parts of the world, which could be published in the Canadian Geographical Journal, the Ontario Geography Monographs, and other provincial teachers professional magazines. Let us not scorn the small professional magazines; they may have more influence than is generally realized.

Much of our research reveals information which is interesting to the general public and which can be put into non-technical or semi-technical terms which may provide interesting information useful to teachers as well as assist us to clarify our own thoughts.

Let us not forget that we draw our future Canadian geographers from our elementary and secondary schools. The more we improve the teaching of our subject in the schools, the more we can strengthen professional geography in Canada.

THE STATUS OF MILITARY GEOGRAPHY IN CANADA

by

P. Uren, M.A.,

Defence Research Board, Department of National Defence

A number of facts prompted me to attempt to review briefly for this meeting the status of military geography in Canada.

First, there is the gravity of the present international situation and the preoccupation of Canada and the other western powers with defence. This is likely to turn the attention of many geographers to the application of their subject to defence problems. Professor E.G.R. Taylor in her address to the British Association for the Advancement of Science in 1947 said, "The older among us have twice experienced the sudden rise in geographical prestige which occurs in wartime". It is not unreasonable to expect a third such rise associated with our current attempts to prevent war by military preparedness. For the realization of total war has moved geography into a key position among the techniques and viewpoints serving the needs of defence agencies. As warfare has come to engross an increasing proportion of the belligerent populations until now it is "total", so military geography has grown far beyond tactical problems of varying terrain and strategic plans for military operations.

The second fact which tempted me to make this presentation was that, in spite of the important place which it holds in other countries, military geography is comparatively neglected in Canada. In order to understand the truth of this it might be worthwhile to examine for a moment the prestige enjoyed by an allied subject, military history. The Royal Military College at Kingston has a professor of military history on its staff and a fairly detailed knowledge of this subject is also a prerequisite of entry into the Canadian Army Staff College. Almost every issue of the Canadian Army Journal contains an article on some aspect of military history and it has from time to time featured papers dealing specifically with the importance of this subject. This is of course as it should be, but it does nevertheless point up the conspicuous absence of military-geographical writings, for the lectures of Professor Griffith Taylor in the Department of Military Science at Toronto University are the exception rather than the rule. Nevertheless, in spite of the neglect of the subject in military education, the need of the military for geographical information remains and is met in questions of overall defence by the Joint Intelligence Bureau.

The third, and not the least important fact I think was written into the Constitution of the Canadian Association of Geographers this morning. The association is to provide for the "direction of geography graduates to new fields of geographical employment throughout the

Canadian nation". The future of geography in Canada will depend to a large extent upon the success with which it is applied to practical problems and, I believe, military geography is a field which offers some opportunities in this respect. I say this on good authority; Field Marshal Montgomery addressing the Royal Geographical Society has said that in his opinion the making of war resolves itself into the simple issue of what is possible and what is not possible. What is possible, he went on to say, and I quote, "will depend first upon geography, secondly, upon transportation in its widest sense and thirdly, on administration. Really very simple issues, but geography I think comes first".

Both the strategy and tactics of warfare are conditioned at every point by the natural environment and because of this fact military geography is as old as armies and has always been taught in military schools. In 1941 the Geological Society of America published a bibliography of military geography and geology which, with a later supplement, contained over five hundred titles although "no effort had been made to make this bibliography comprehensive". The large number of papers published in the Geographische Zietschrift which were concerned with the First World War, 1914-18, and later work in the Zietschrift fur Geopolitik give ample proof of Germany's interest. Even before this, the great Prussian general Von Moltke and the minister of war, Von Roon, studied under Karl Ritter, one of the two nineteenth century founders of modern geography. Military geography is thus no new invention. The German military establishment, through its general staff, had long been in the habit of gathering systematically and digesting information about the earth. Haushofer intensified this work and, long before the Second World War, his research groups at Munich were doing what we were obliged to do belatedly in the course of fighting. We have doubtless learned our lesson and it is this fact which makes military geography a possibility as a career.

Broadly speaking, the task of the military geographer is to relate the facts of the particular natural environment under study to the problems of defence and national security. This work falls into two main categories; the studies required in the overall planning of defence activities in peace or war; and the detailed tactical studies required for individual operations.

The answer to the first problem is, of course, partly a matter of purely political and military interest but it is also largely geographical. The bases of national power, and equally as important, the sources of national weakness, are to be found in the economic geography of a country. Military success tends to depend more and more upon machines and so upon industry and transportation facilities. By an assessment of the economic resources of a country and its state of economic development an estimate of its ability to make war can be made; and by the same means a shrewd guess can often be made about its intention to do so. This is not always as simple as it appears at first glance; it is not simply a matter of comparing production figures and railway capacities. These may form basic data but they must be

related to the organisation and other characteristics of the armed forces involved. The danger of judging the enemy by ourselves is very real, but within a certain margin of error it is possible by careful study to come to some fairly firm conclusions as to his war-making potential.

The detailed tactical information required for the planning of specific operations such as the Normandy Landing or Exercise Muskox is more particularly the province of the physical geographer. In all operations employing ground forces the more the knowledge of the terrain the greater is the chance of success. It is, of course, not the origins of the landforms so much as their characteristics in terms of the forces, vehicles and other equipment to be used that is important. Information about climate and vegetation is also important as it affects the issue of clothing, rations and fuel and allows the commander to make the maximum use of concealment and camouflage. In large scale operations the availability of building materials for roads and airstrips is important and sometimes the human geography must be taken into account where the local inhabitants may be either a help or a hindrance to the forces employed. For example, the maps provided to German officers in their advance into Russia showed clearly the communities which contained a majority of German inhabitants. In fact every feature of the geographical environment has a military significance which, however, has no absolute value but is relative to the nature of the operation, and the forces and equipment employed, and so must be re-assessed continually.

There is another aspect of military geography which deserves attention — that is its place in the education of the soldier. Colonel E.S. May addressing the British General Staff in 1906 said that "It is because they stir the imagination that Military History and Geography are so valuable to the soldier, enlarge his horizon, and foster military instinct. We cannot profit by one without a knowledge of the other, and some of the most difficult problems that puzzle generals are in their essence geographical". It is also useful in the detailed execution of his practical tasks. Professor Taylor has elaborated on the value of a knowledge of geomorphology to the junior officer. "Geomorphology should be part of the education of at least some elements of army personnel. A foreknowledge of the whole assemblage of surface features to be expected in a particular type of country, whether chalk, limestone, clay, formerly glaciated, rejuvenated or whatever it might be, would allow of valuable forecasts as to water supply, vegetation, location and grouping of habitations and many other matters. Conversely the presence of certain tell-tale features on the map would indicate to the trained observer the character of the terrain; the boundary between chalk and clay, for example, with all its implications for good going, is sharply marked. Modern geography, however, is not included in the education of the young officer, and an examination of his map-reading manual, excellent although it is in many respects, reveals an astonishingly meagre and outmoded vocabulary for the description of surface relief -- a vocabulary that can be traced back to the French military manuals of the last century. An object for which we have no name is likely to go unnoticed, or at best be

very clumsily described, and an officer's reconnaissance notes would certainly gain were he master of the rich and promise topographical vocabulary which geography employs".

The qualifications of the military geographer are implicit in the description of his work, but I would like to list the more important of them since they do point up the fact that military geography not only deals with a special set of facts but also gives them a special treatment. There is always a danger that the geographer will provide the soldier not with military geography but with a mass of geographical detail which he thinks the army should know. Military men have an abiding distrust of the scientist. And the geographer who approaches them in the spirit of the missionary spreading truth and light will have a cold reception. This I think explains the failure of some military-geographical textbooks. The complexities of the Canadian Shield hold no attraction for the soldier unless it can be demonstrated that they affect his efficiency. If the geographer must have regions then they must be defined for soldiers in terms of movement, concealment, zones of fire and other qualities of interest in the tactical problems of the commander in the field.

The main qualifications for this type of work are as follows:

(a) First, of course, an understanding of physical and economic geography.

(b) Secondly, a knowledge of the organisation and role of at least one of the fighting arms, infantry, armour or artillery. This is as important as the economic geographer's knowledge of economics. It should be remembered that geographic conclusions from soldiers with inadequate geographical training are perhaps less dangerous than strategic or tactical conclusions from geographers with inadequate military training.

(c) Thirdly, a familiarity with the more important military thinkers such as Clausewitz, Moltke, Mahan and others. This is not because the average geographer will have occasion in his daily work to expound great strategic concepts but because these writings give one a military habit of thought and are broadening just as the work of Adam Smith or Karl Marx might be to the economic geographer.

(d) Finally, there is the more subtle ability, to make a synthesis of military and geographical facts -- to write geography for the soldier and not for other geographers.

A combination of these qualifications in one person is extremely rare and the opportunities for employment are of course, limited but it is nevertheless worthwhile to remember that military geography is simply another field of applied geography and its success depends to a certain extent upon the salesmanship of the people practising it. It must be shown that we can make a contribution in this field. If this is done the prestige of profession and scope for the newcomer to it will be increased accordingly. It was said in ancient times that "War is the father of all things". I hope that is not true but nevertheless there are few fields in which we can make a greater contribution than in the preparation for defence.

L'ENSEIGNEMENT ET LA RECHERCHE GEOGRAPHIQUES EN FRANCE

par

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Institut d'Histoire et Géographie, Université Laval

Nous négligeons délibérément l'enseignement primaire, pour concentrer notre attention sur l'enseignement secondaire et surtout supérieur.

L'ENSEIGNEMENT SECONDAIRE

Programmes

Les programmes géographiques sont conçus en vue de donner aux jeunes gens une culture générale et non un enseignement d'érudition et de spécialisation; chacune des sept années du cycle secondaire comporte ainsi l'étude d'un ou plusieurs continents; cette non-spécialisation se marque, par exemple, dans le fait que l'ensemble France et Union Française ne sont pas morcelés en plusieurs années. Pour fixer les idées, donnons ici le découpage du programme s'étendant sur les sept années.

1er cycle	- Classe de Sixième:	Géographie Générale
	- Classe de Cinquième:	Amérique, Asie, Afrique, Océanie
	- Classe de Quatrième:	Europe et URSS
	- Classe de Troisième:	France et Union Française
2e cycle	- Classe de Seconde:	Géographie Générale
	- Classe de Première:	France et Union Française
	- Classes de Philosophie et de Mathématiques:	Les grandes puissances, les grands produits et la circulation dans le monde.[1]

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[1] Si les lecteurs veulent des précisions sur les pays que les programmes français classent comme grandes puissances, ils se reporteront à l'appendice de cette communication.

On remarquera que l'ensemble France-Union Française ainsi que la géographie générale sont traités intégralement dans les deux cycles.

Méthodes

Dans la majorité des établissements, on pratique les méthodes dites actives (excursions dirigées par le professeur, séances de projections, films, parfois petit laboratoire de géographie physique, travaux dirigés).

Les livres obéissent à un triple souci: ils favorisent les méthodes actives, en proposant des thèmes de discussion, en particulier à l'aide des illustrations photographiques et cartographiques; ils visent à la culture générale; surtout, ils sont au courant des dernières recherches géographiques -- par exemple, les dernières éditions des manuels de géographie générale exposent les conclusions récentes des travaux sur les structures agraires, et n'hésitent pa à introduire la théorie des fronts en climatologie.

Qualifications des Professeurs

Le titre élémentaire exigé pour enseigner est la licence; différents de la maîtrise des pays de langue anglaise, elle comporte, pour la géographie, quatre certificats.

En fait, on exige davantage; la licence est suivie d'un diplôme d'Etudes Supérieures de Géographie, travail personnel d'une centaine de pages, sorte de petite thèse; son élaboration exige en général une année de travail avec de nombreuses recherches dans les bibliothèques ou sur le terrain.

Le professeur d'enseignement secondaire a alors le choix entre deux concours d'Etat, l'un intitulé Concours d'Aptitude au Professorat, l'autre, plus sévère, appelé Agrégation. Ces concours préparés dans les Universités contribuent à maintenir un lien étroit entre le Secondaire et le Supérieur.

L'ENSEIGNEMENT SUPERIEUR

Programmes

Comme il vient d'être dit, le principal objectif des cours d'Université est la préparation à la Licence, car en fait, pour la géographie, la plupart des étudiants se destinent à l'enseignement. Des quatre certificats qui composent la Licence de géographie, les deux principaux sont la géographie générale et la géographie régionale.

Géographie Générale

Ce certificat comporte obligatoirement certaines questions et, selon les années, d'autres matières. Les questions qui font toujours partie du programme de ce certificat sont la géomorphologie, les principes de la cartographie, la géographie urbaine, les structures agraires, densités de population, genres de vie.

A ces questions, on ajoute, en géographie physique, une année la climatologie, l'année suivante l'hydrologie (fluviale et marine) et la biogéographie, et ainsi de suite alternativement. En géographie humaine et économique une année, par exemple: la circulation et certains grands produits économiques; l'année suivante, d'autres produits et les migrations humaines; et ainsi de suite alternativement.

Les cours traités par les professeurs varient, par conséquent, chaque année selon les questions mises au programme.

Géographie Régionale

Le même système est employé. Une partie du programme est invariable et une autre partie varie selon les années. La France et l'Afrique du Nord sont toujours au programme. Mais le cours sur la France, nécessairement détaillé et offrant une matière trop abondante pour être traité en un an, s'étend sur trois, quatre ou cinq années selon les professeurs et les universités.

En plus de cette partie fixe, les programmes comprennent deux ou trois grands ensembles régionaux tels que, une année, l'Amérique du Sud est une partie de l'Europe, par exemple, une autre année, une autre partie de l'Europe et l'Amérique du Nord, etc...

Tout ou partie du programme est traité dans les cours des professeurs.

Méthodes

En plus des cours, les étudiants suivent des travaux pratiques qui consistent à expliquer et commenter les cartes topographiques, en particulier à l'aide de coupes géologiques. Les cartes examinées sont surtout les cartes françaises et nord africaines, et les étudiants sont tenus de faire obligatoirement ces devoirs; en général un devoir par quinzaine.

Dans la plupart des Universités, (surtout en province où les étudiants sont moins nombreux), ceux-ci sont obligés de faire une leçon chaque année.

Les assistants -- dont nous reparlerons plus loin -- suivent les étudiants en les dirigeant dans la technique du commentaire des cartes et dans la préparation des exposés.

La géographie française n'est pas seulement une géographie livresque; les travaux sur le terrain sont faits en commun par les professeurs et les étudiants; il s'agit tantôt d'excursions d'une journée, a proximité de la ville universitaire, tantôt d'excursions lointaines durant plusieurs jours et souvent avec la collaboration d'autres universités, françaises ou étrangères.

Parfois les étudiants font seuls un travail sur le terrain et le devoir consiste à rédiger un bref mémoire.

Mais les travaux les plus importants de ce genre sont les Diplômes d'Etudes Supérieures dont nous avons déjà parlé.

Qualifications des Professeurs

Les professeurs d'Université doivent avoir leur Doctorat d'État. En fait, seuls les Docteurs déjà agrégés deviennent professeurs d'Université et presque toujours après avoir été professeurs d'enseignement secondaire, de sorte que la série de leurs qualifications comporte la Licence, puis le Diplôme, ensuite l'Agrégation et enfin le Doctorat.

De jeunes agrégés de l'enseignement secondaire peuvent être détachés trois ou quatre ans comme assistants dans une Université.

LA RECHERCHE

Conditions de la Recherche

La recherche est considérée comme la fonction essentielle du professeur d'Université. A cette fin, celui-ci n'a que trois ou quatre heures de cours par semaine; ainsi il peut consacrer à la recherche un certain nombre d'heures chaque semaine.

Quand cela est possible, on concentre les cours sur deux ou trois jours consécutifs, de façon que le professeur puisse se livrer sans interruption à ses recherches.

Depuis la guerre, surtout, le Conseil National de la Recherche Scientifique octroie des bourses d'études ou engage à plein temps des professeurs préparant un travail, soit qu'ils enseignent déjà dans une université, soit qu'ils s'y destinent en achevant une thèse de Doctorat.

Une autre formule favorable à la recherche géographique est l'institution des assistants. Ceux-ci profitent du temps libre qui leur est spécialement ménagé, pour préparer leurs travaux (dont, soit dit une fois de plus, la thèse de Doctorat).

Expression de la Recherche

Les Revues

Le principal moyen d'expression de la recherce réside dans la publication de revues qui répondent à des préoccupations diverses. Les unes ont avant tout le souci de l'information pédagogique, par exemple l'Information Géographique, principal responsable de la coordination entre le Secondaire et le Supérieur.

Certaines ouvrent leurs colonnes à l'information géographique la plus générale et la plus variée, avec des articles de recherche pure et une importante partie bibliographique; telles les Annales de Géographie et la Revue de Géographie Alpine.

D'autres revues publient que des communications de pure érudition; par exemple le Bulletin de l'Association des Géographes Français.

Enfin quelques revues dirigées par les Universités de province limitent leurs investigations à certains ensembles régionaux; ainsi les Cahiers d'Outre-Mer s'intéressent surtout à l'Afrique Noire et l'Amérique Latine, la Revue Géographique des Pyrénées et du Sud-Ouest à l'Aquitaine et à la Peninsule Ibérique, la Chronique Géographique des Pays Celtes aux régions contenues dans ce titre.

Les Thèses de Doctorat

Depuis 1900 environ, chacune des nombreuses thèses a apporté, en quelque sorte une pierre à l'édifice de la géographie française. Elles ont toutes pour caractère commun une préoccupation essentiellement régionale; cette étude régionale est parfois uniquement physique, comme celle de A. Guilcher sur le relief de la Bretagne méridionale, ou exclusivement humaine, comme celle de Le Lannou sur la vie rurale de la Sardaigne; d'autres thèses, sans se borner aux seuls points de vue, soit physique, soit humain, étudient une région sous tous ses angles, telles les très nombreuses thèses des géographes grenoblois sur les vallées alpines.

La thèse principale est toujours doublée d'une thèse complémentaire, travail analogue, mais de moindre portée. C'est cette abondante bibliothèque de monographies qui a permis la publication des grandes collections régionales françaises et des ouvrages de synthèse sur la géographie de la France.

Les Autres Livres

Il s'agit surtout de grandes collections à caractère général (comme la collection de Géographie Humaine dirigée par P. Deffontaines) et surtout régional; les unes sont à l'échelle mondiale comme la Géographie Universelle, les autres se bornent à la description régionale de la France.

Le plus souvent il s'agit de livres isolés dont les sujets très variés élargissent le champ de la recherche française.

Champ de la Recherche

En Géographie Générale

Certains thèmes ont retenu particulièrement l'attention des géographes français: le relief glaciaire (Alpes, Province de Québec, Atlas Marocain, Groënland), le cycle d'érosion normale (pénéplaines d'Europe Occidentale), le relief désertique (Institut des Recherches Sahariennes de l'Université d'Alger), l'habitat rural et les structures agraires (bocage et openfield dans l'Ouest et le Sud de l'Europe).

En Géographie Régionale

Grâce aux thèses de Doctorat — dont nous parlons plus haut — tout le tour de la géographie de la France a été fait et il ne reste plus guère de régions à étudier.

Déjà depuis quelques décades, les géographes français étudient davantage l'Union Française et les autres pays.

Dans l'Union Française, c'est naturellement l'Afrique du Nord qui retient l'attention. L'essentiel du travail géographique est fait par l'Université d'Alger, les Instituts algériens, marocains et tunisiens et les géographes métropolitains en séjour d'étude en Afrique du Nord. Les thèses de Doctorat et les Diplômes d'Etudes Supérieures se font de plus en plus nombreux dans les trois pays; le Maroc publie deux revues géographiques, l'Université d'Alger deux également.

L'Institut Français d'Afrique Noire fait progresser rapidement la connaissance géographique de l'Ouest et du Centre de l'Afrique. Plusieurs thèses et ouvrages d'érudition géographique font connaître l'Indochine, Madagascar et les Antilles.

Parmi les territoires non français, l'Amérique du Sud surtout, l'Asie des Moussons à un moindre degré, ont fait l'objet de sérieuses recherches.

Les Tendances Actuelles de la Géographie Française

Deux tendances s'affrontent que l'on peut appeler l'une "expansionniste" et la seconde "restrictive". La tendance expansionniste est suivie surtout par l'école parisienne qui pense que la géographie a avantage à déborder hors de ses frontières traditionnelles, par exemple sur la géologie (d'où la "morphogénie") ou l'économie politique (d'où la planification). Par contre, une conception dont M. Le Lannou s'est fait le porte-parole, restreint le champ de la géographie aux études régionales humaines.[1]

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[1] M. Le Lannou. La géographie humaine, Flammarion, Paris, 1949,

En conclusion, ne peut-on pas parler d'un certain rayonnement de l'école française si l'on veut bien considérer qu'une vaste partie de l'Afrique n'est étudiée que par des Français, que les publications géographiques françaises sont lues sur le continent européen, dans les Iles Britanniques et en Amérique Latine et qu'enfin des noms [illegible] ceux des Demangeon, des de Martonne et des Baulig appartiennent non seulement a la géographie francaise, mais à la géographie tout court?

APPENDICE

Europe: (La France et l'Union Française ont été étudiées dans des classes précédentes)

Iles Britanniques, Benelux, Allemagne, Europe Centrale, Italie

URSS

Asie: Chine, Japon, Inde et Pakistan

Océanie: Australie et Nouvelle-Zélande

Amérique: Canada, Etats-Unis, Brésil, Argentine

Afrique: Union-Sud-Africaine, Congo Belge.

A SURVEY OF SINGLE COUNTRY ATLASES

by

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ETUDE COMPARATIVE DES TEMPERATURES DES CANTONS DE L'EST, DE QUÉBEC ET DE MONTRÉAL

par

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EVOLUTION DES FONCTIONS URBAINES DE CHICOUTIMI

par

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Chicoutimi est la principale ville de la région Saguenay-Lac Saint Jean, même si sa population de 28,000 habitants est inférieure à celle de la conurbation Kénogami-Jonquière. Centre commercial, judiciaire et éducationnel de cette vaste contrée, Chicoutimi en est aussi le centre ecclésiastique. Ses fonctions sont le résultat des facteurs physiques qui ont présidé à sa création et déterminé son évolution. Cette évolution est marquée par la prédominance de deux fonctions: d'abord ville industrielle, Chicoutimi, après 1929, devient une ville commerciale.

L'emplacement d'une ville dépend en partie des éléments locaux qui le constituent. Aussi Chicoutimi doit-elle son origine à deux affluents du Saguenay: la rivière du Moulin et la rivière Chicoutimi. Ces deux cours d'eau ont effectué une trouée à travers les terrasses marines et les dépôts glaciaires pour y constituer deux petites plaines permettant l'installation d'une ville et d'un port. Partout ailleurs, les versants du Saguenay sont élevés, abrupts et hostiles à l'installation urbaine. Ces deux rivières, grâce à leur débit rapide et abondant, permettaient d'amener le bois des riches fôrets de pins de l'intérieur. Tels sont les éléments locaux qui ont incité les hommes à fonder une ville à Chicoutimi.

La vocation de Chicoutimi a été, jusqu'en 1929, industrielle et liée à l'exploitation forestière. Cette première vocation de Chicoutimi n'a pas été le fait de l'agriculture parce que celle-ci était, à cette époque, prohibée dans la région. La ville est née de la forêt, assez subitement, comme il arrive souvent en pays neuf, et son développement industriel a été fonction de l'exploitation forestière. Jusqu'en 1897, les scieries ont été à la base de l'activité des habitants.

En 1842, un métis, Peter McCleod, ancien employé de la Compagnie de la Baie d'Hudson, construisit une scierie à la rivière du Moulin et fit venir des ouvriers de Charlevoix et de la rive sud du Saint Laurent. Son entreprise partit sur un si bon pied que, l'année suivante, il érigea une autre installation à la chute de la rivière Chicoutimi. Le succès de McCleod força William Price, déjà installé à la baie des Ha! Ha! a s'associer avec lui. Les scieries de Chicoutimi employaient 300 hommes et, dès 1851, on pouvait charger 35 navires pour l'Europe et une centaine de goélettes pour le Canada et les Etats-Unis. L'exploitation du pin connut alors un

essor considérable. En 1862, 43,000 billots de pin et 7,000 billots d'épinette furent dirigés vers le marché européen, tandis qu'environ 140 goélettes alimentèrent le marché canadien et américain. Pendant cette période, la population de la ville s'accrût de 1,200 à 4,035 habitants. En somme, l'industrie forestière s'accrût constamment jusqu'en 1870.

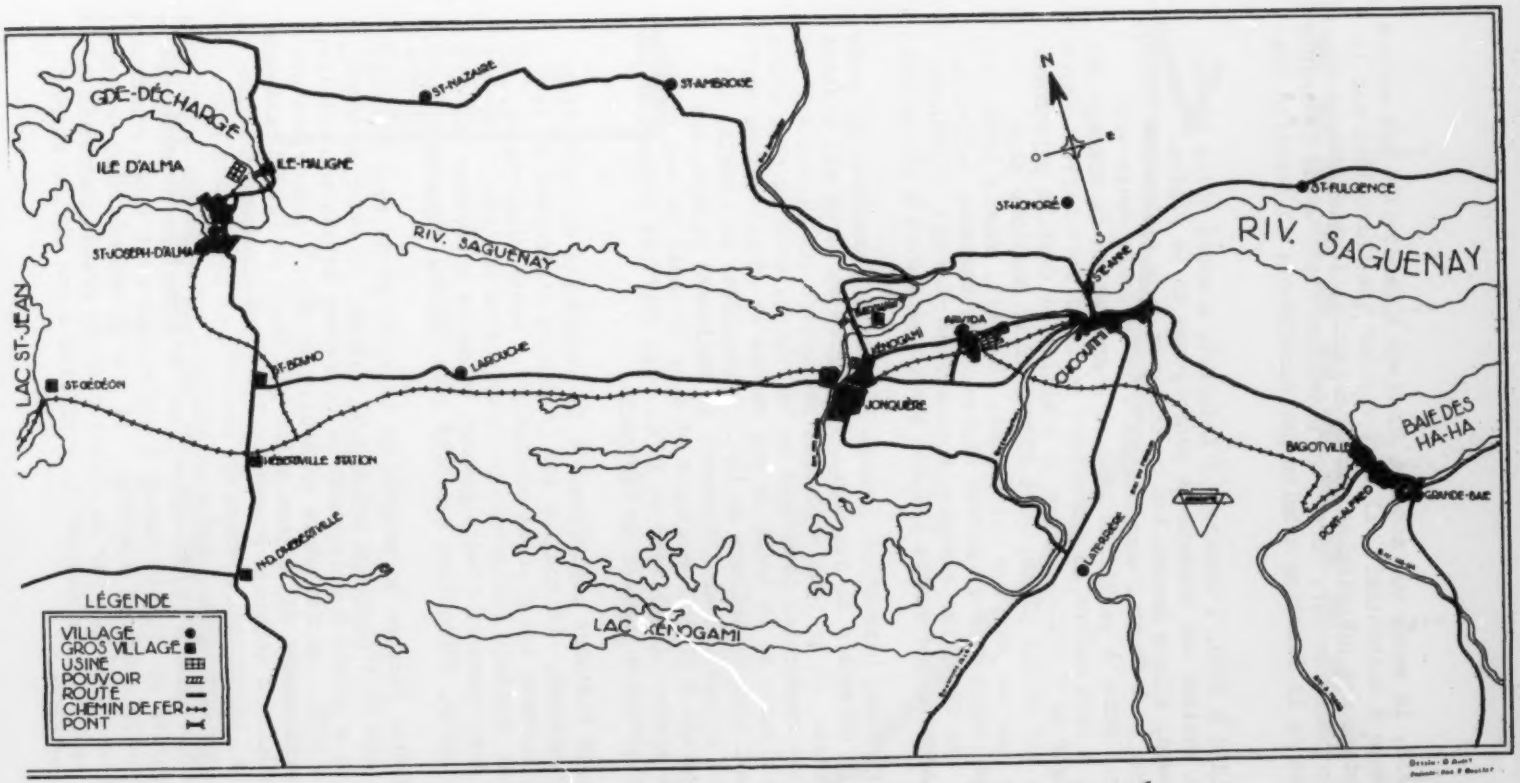
A partir de cette date, les scieries commencèrent à décroître pour deux raisons: l'une permanente, l'exploitation irrationnelle des forêts de pin; l'autre accidentelle, un terrible feu de forêts. Aussi, dès 1871, la compagnie Price abandonna sa scierie de la rivière du Moulin et la population de la ville tomba à 1,380 habitants. Pendant plusieurs années, seul l'accroissement naturel permit une augmentation de la population. Vers la même période, l'épinette devint la base de l'industrie forestière, les réserves de pin étant à peu près complètement épuisées. En 1881, près de 190,000 billots d'épinette et seulement 12,000 billots de pin furent taillés. La même année, on signale encore plusieurs navires norvégiens à Chicoutimi. Mais après cette période d'instabilité devait commencer pour la ville une ère nouvelle au cours de laquelle elle perdra ses derniers vestiges de fonction rurale. Une nouvelle industrie va supplanter celle des scieries: la pâte de bois.

En 1897, Alfred Dubuc fonde la Société de Pulpe de Chicoutimi. A l'embouchure de la Chicoutimi il installe deux usines possédant cinquante défibreuses. En 1912, ces usines employaient 800 hommes. Douze ans plus tard, elles comptaient 1,200 employés. La production s'élevait à 330 tonnes par jour et se vendait surtout en Angleterre et aux Etats-Unis. Cet essor industriel provoqua une augmentation considérable de la population qui passa de 4,000 habitants en 1902 à 10,000 en 1929. Cette même année, l'usine dut fermer ses portes à cause de difficultés financières et surtout par suite de la concurrence faite par les papeteries de Port-Alfred, de Jonquière et de Kénogami. En 1924, Kénogami à elle seule produisait 550 tonnes de papier par jour.

Cet arrêt subit de l'industrie posait un grave problème pour la ville. Allait-elle disparaître puisqu'elle perdait la source de sa prospérité? Non, car sa situation lui assurait une autre vocation.

Pendant tout le cours de son développement industriel, Chicoutimi était rapidement devenu le centre commercial de la région. C'est au moment où disparaît son industrie que sa situation comme point de rupture de charge sur le Saguenay et comme débouché des routes venant de l'extérieur va lui permettre de se développer en se vouant au commerce.

Chicoutimi est placé sur le bas-Saguenay, au contact de la rivière et de son estuaire. A Chicoutimi, le Saguenay n'a que 2,440 pieds de largeur et cet "étroit" ne se retrouve nulle part. De plus, la ville est au terme de la navigabilité de la rivière. Plus à l'amont, celle-ci voit son cours coupé par la chute à Caron, tandis qu'entre les Terres-Rompues et Chicoutimi, la profondeur varie entre 10 et 30



RÉGION DE CHICOUTIMI - QUÉ.

ÉCHELLE: 1 PELLE AU POUCE

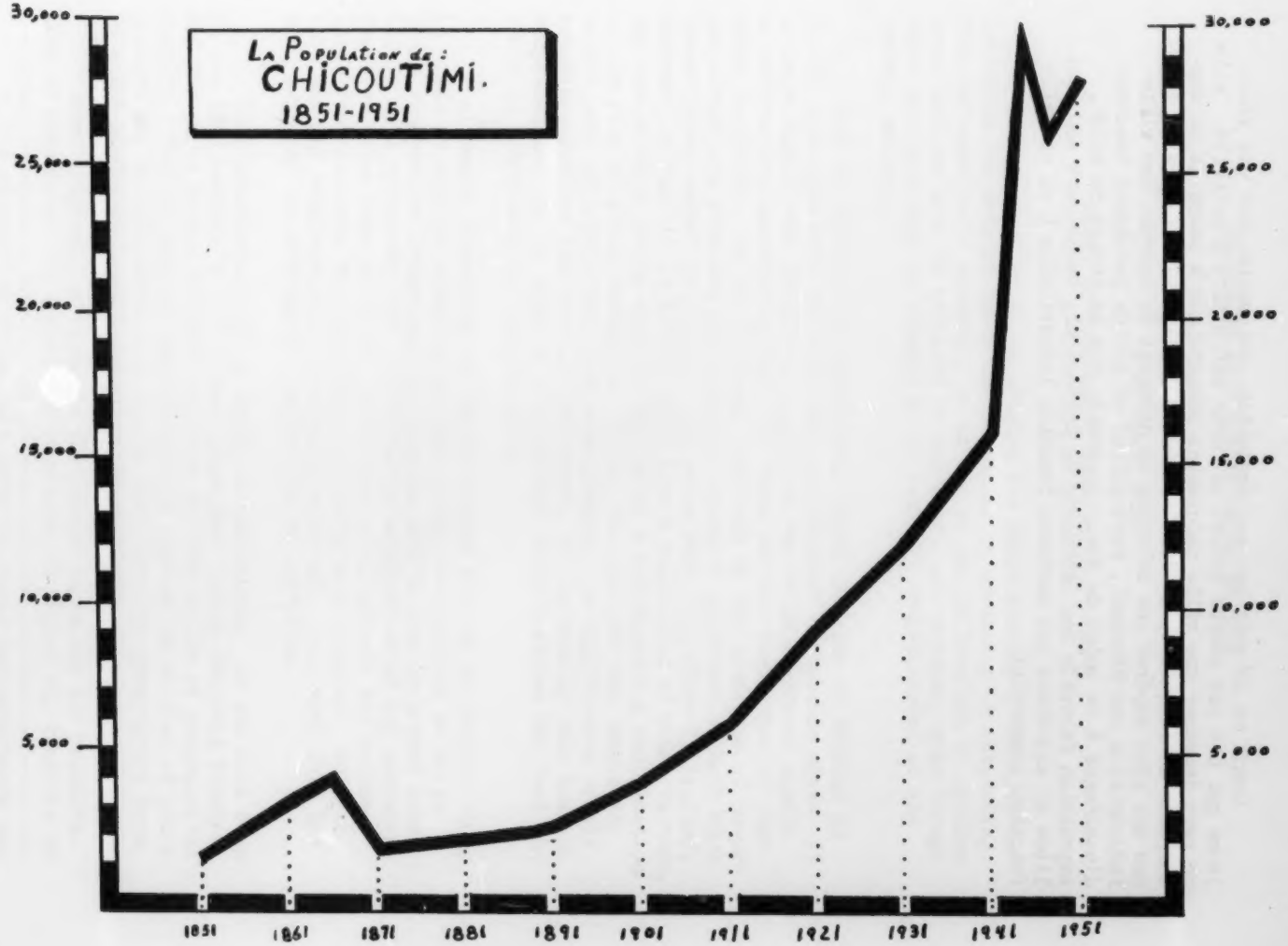
pieds. Enfin, la marée qui atteint 20 pieds à Bagotville est encore très puissante à Chicoutimi. Il faut ajouter que Chicoutimi est le point d'arrivée des principales routes venant de l'extérieur et le terminus du chemin de fer. Bref, sa situation était assez favorable à l'éclosion de la fonction urbaine par excellence: la fonction commerciale.

De 1840 à 1929, l'essor de l'industrie a amené celui du commerce et Chicoutimi est devenue la pourvoyeuse de la région. Pendant longtemps, elle a monopolisé le commerce sous toutes ses formes, parce que son port était l'aboutissement de la seule route vers l'extérieur. Mais, à partir de 1900, l'augmentation du tonnage des navires lui a fait naître un concurrent sérieux: Port-Alfred. Avec sa baie longue de 7 milles, large de 2 milles et dont la profondeur varie entre 537 et 218 pieds, Port-Alfred offre beaucoup plus d'avantages pour un port que Chicoutimi. De fait, depuis 1900, les activités maritimes de Port-Alfred dépassent de beaucoup celles de Chicoutimi. En 1950, par exemple, Port-Alfred recevait 2,950,000 tonnes de marchandises contre 178,000 tonnes seulement à Chicoutimi.

Malgré cela, Chicoutimi demeure le centre commercial de toute la région: la clientèle de ses magasins de gros et de détail s'étend jusqu'à Dolbeau. Il ne faut cependant pas croire que Chicoutimi est le seul centre commercial important de la région, avec sa population de 28,000 habitants et le total de ses ventes de détail qui se chiffrait à 21 millions de dollars en 1950. Jonquière, sa rivale, qui est également située à l'aboutissement du boulevard Talbot, est rapidement passée à 21,500 habitants et a vu le total de ses ventes de détail atteindre 14 millions en 1950. Ces chiffres n'incluent pas le ville industrielle jumelle de Kénogami.

D'autres facteurs contribuent à la prospérité de Chicoutimi et à son rayonnement. Chicoutimi est un centre d'affaires où se trouvent les bureaux des grandes compagnies. Centre judiciaire, elle est aussi capitale religieuse de toute cette contrée. On y vient aussi pour recevoir l'enseignement primaire supérieur et secondaire. Enfin, Chicoutimi est doté d'un hôpital important.

Un dernier facteur du progrès de la ville et de tout le comté est le voisinage de l'Aluminum Company of Canada. L'essor de cette usine d'Arvida a permis à Chicoutimi de conserver intact son quartier ouvrier après 1929. La fermeture du moulin de pâte à papier n'a pas affecté l'accroissement de sa population qui était de 12,000 habitants en 1932. Pendant la dernière guerre, grâce au développement industriel d'Arvida, Chicoutimi a connu un surcroît de population pour atteindre 30,000 habitants. Après le conflit, cet excédent a diminué et la population tomba à 26,000 habitants. L'expansion considérable d'Arvida a profité et profite encore à Chicoutimi dont 1,620 résidents travaillent quotidiennement à Arvida. Il y a là cependant un danger qui ne peut être évité que par la création d'une grande industrie ou de plusieurs petites pour assurer la stabilité à une partie appréciable de la population.


La Population de :
CHICOUTIMI.
1851-1951
30,000
25,000
20,000
15,000
10,000
5,000
1851
1861
1871
1881
1891
1901
1911
1921
1931
1941
1951

Comme on le voit par son évolution, Chicoutimi est une ville jeune qui n'a pas encore trouvé sa forme définitive d'activité. Elle ne peut demeurer une ville uniquement commerciale à cause de la concurrence de Jonquière, de Port-Alfred et de Bagotville; elle ne doit pas non plus espérer une solution en devenant de nouveau une ville industrielle car Kénogami, Port-Alfred et Arvida possèdent beaucoup d'avantages à ce point de vue. Je crois, que la "Reine du Nord", expression favorite des habitants de Chicoutimi, trouverait son équilibre en associant son ancienne fonction industrielle à sa nouvelle fonction commerciale.

PROCEDURE IN STUDYING SHORE EROSION[1]

by

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In any study of shore erosion the immediate aim is usually to determine the rate at which the shoreline is advancing or retreating. This information is necessary as an aid in the delineation of problem areas and has been so utilized in numerous shore studies, even though these may have made no attempt at an over-all comprehension of the erosion pattern.

Such an approach is superficial since the rate of erosion is at the same time more and less than an indicator of trouble spots. It is more significant because it expresses the balance between agents of destruction launched against the shore and the resistance of that shore to attack. It is the final resultant of the interplay of numerous forces and provides the essential frame of reference without which these forces cannot be judged. Its value when used alone is limited, however, in that it is nothing more than a reflection of other factors, any one of which being changed will bring a corresponding modification in the rate of shore recession. It is true that one who completely understands this rate must have also grasped the significance of all related shoreline features and processes. It is equally true that no comprehension can be based on a knowledge which includes how fast the shore is retreating and nothing more.

Although, therefore, we should concur that in an erosion study it would be well to establish at the outset the rapidity at which shore changes are occurring, the inquiry should then be turned immediately to a systematic and comprehensive examination of all shoreline features which have an effect on erosion or illustrate its course. These features must be identified, evaluated and compared. Only in this way may complete understanding be achieved. Only when this has been done may the drawing of conclusions be justified.

This procedure is by no means an innovation. It was laid down in the 18th century by the German geographer Johann Reinhold Forster and has since become standard practice in most fields of geographical enquiry. That it has not been adequately applied in studies of shore erosion may be attributed only to the fact that few geographers have thus far conducted investigations of this nature.

More original, perhaps, is the method suggested for presentation of this data. An effort has been made to depict all findings on

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[1] The research on which this paper is based was undertaken under a scholarship given by the Research Council of Ontario.

a single composite chart to permit their easy correlation and comparison. Study of this chart, with the facilities it affords for simultaneous consideration of all the results of the investigation, can hardly fail to result in the recognition of numerous relationships, some of which are mentioned in this paper.

The area to which these methods have been applied in practice is the north shore of Lake Erie from Point aux Pins to Long Point. The greater part of this area, comprising some seventy-seven miles of lake frontage, is characterized by a bold shore cliff and is subject to active erosion. There has been no significant human interference with erosive processes except at Port Stanley, Port Bruce and Port Burwell where breakwaters built at right angles to the shore have influenced the distribution of beach materials.

We shall now consider the methods followed in obtaining detailed information about the shore. Observations are grouped under the following headings: rate of erosion, visible and tangible shore characteristics and agents of erosion.

It is evident that the amount of shore recession may be determined only by a comparison between the present position of the littoral and that shown by early surveys. While the general procedure is straightforward, certain precautions may deserve mention. Many old plans and maps exist, but some contain inaccuracies in drafting, others are based on imperfect source material and all have suffered by shrinkage or stretching of the paper on which they are printed. It will be found advisable in all cases, therefore, to refer to actual notes of the early surveys and from them to restitute the former shoreline. The modern shore is then delineated preferably with the aid of aerial photographs. After this is done the average annual amount of shore advance or retreat may be calculated.

The investigator should then turn to the shore cliff itself and attempt to chart those characteristics which are directly observable: height, slope, composition and form. Bluff height may be determined by direct levelling or triangulation in the field, from aerial photographs with the use of a steroscopic height-finder, or in certain cases from contour maps. Where the height is large in comparison with the contour interval and is not subject to significant variations within a small area, the last method is recommended because of the economy of time involved.

Once the height of the bluff is known, slopes may be accurately and rapidly derived from aerial photographs. Under stereoscopic observation the summit and base of the cliff may be precisely located and marked with pin pricks. The distance between the two is then scaled. It is necessary to make a correction for photographic displacement of

one point relative to the other,[1] but with this correction applied the true horizontal distance between the crest and the foot of the cliff is obtained. This value when divided into the height of the bluff gives the tangent of the angle of slope.

Direct slope measurements, on the other hand, are often difficult due to convexity of the bluff face which precludes intervisibility between base and summit. Furthermore where the cliff is much broken it is not easy for an observer on the ground to select a representative slope for measurement. Slope derivations from aerial photographs are therefore generally preferable.

Ground observations are essential, however, to determine the composition of the bluff. Examinations at regular intervals of the exposed profile may be used as the framework for drawing up a geologic cross section of the shore cliff. In completion of the cross section aerial photographs again prove valuable since layers of material may frequently be traced from one observation point to the next, and any important changes occurring within the interval are normally evident on the photos. The precise nature of these changes may then be checked by further field observations. An important part of the study of bluff composition is mechanical analysis of representative samples in order to determine the percentage of beach-building materials which is present.

Bluff form is a more elusive term than are height, slope and composition since its major components, though of considerable importance, are not always susceptible of precise definition. Furthermore, discontinuity of any feature is the rule rather than the exception. Different shore cliffs often have unique characteristics and each must be studied individually.

Illustrations are presented from the study area, however, where significant examples of bluff form are found to be gullies, scalloped indentations at the top of the cliff, accumulations of slumped material at water level and a slow slipping of relatively intact linerr blocks down the cliff face. All of these may be accurately mapped from aerial photographs with the partial exception of the last. Slipping of the bluff face is not always clearly defined on photographs and should be checked in the field as well.

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[1] Correction for displacement equals $\frac{Dh \sin x}{H}$, where D = the distance in inches on the photographs from the top of the bluff to the principal point; h = bluff height in feet; x = the angle between the line tangent to the shore at the point of measurement and the line joining that point with the principal point of the photograph; H = aircraft height in feet above the lake. Correction to be added to the scaled distance if the principal point is landward of the line tangent to the shore through the point of measurement; otherwise subtracted.

An example of the graphic presentation of shore characteristics is given in Figure 1. About fourteen miles of shore is represented, centered two miles west of the town of Port Stanley.

Bluff height is given in the first two sections of the chart, in both of which a uniform vertical scale is maintained. The upper diagram, however, is primarily a recording of slopes. These have been divided into seven categories which advance in multiples of ten degrees from slopes under 20° to those exceeding 70°.

Composition of the cliff is shown in two ways. A cross section has been drawn up classifying materials in the exposure by origin and texture. Also, the results of mechanical analysis of samples of the bluff are shown by numerals in small circles. Reading from above downwards and from left to right, these figures show the percentages obtained respectively, of beach building materials, fine sand, silt and clay. Arrows show the precise location from which each sample was taken.

Under miscellaneous shore characteristics are included stream valleys, shown by gaps in the profile; gullies, denoted by narrow vertical V's; scallops at the top of the bluff indicated by scallops of similar form described on the upper part of the diagram; slipping of the bluff face, recorded as horizontal lines in the main body of the diagram, and the position of slumped promontories marked by short series of horizontal lines below the profile proper.

Consideration must now be given to the principal agencies of shore erosion. Most important of these are wave attack, direct wind action, surface runoff and underground drainage. The last two are rendered more efficient with alternate freezing and thawing and the effectiveness of all is modified by the nature of the materials being eroded.

Since most of these forces produce characteristic bluff forms, it is a relatively simple matter to point out the areas in which each is particularly active. Winds create elaborate carvings in fine sand, smooth sand slopes in coarser sand and may form sand dunes. Surface runoff gives rise to gullies and scalloped indentations. Water percolating downwards into small cracks and then freezing may cause deep fissures to develop. Underground drainage brings an outward seepage of saturated materials which results, in turn, in slipping of the bluff face and is a factor in the formation of slumped promontories.

The severity of wave attack cannot be as easily judged. Since it is by far the most important cause of erosion, however, some indication of its relative value is basic to any understanding of the complex processes of shore reduction. Precise determination required lengthy and elaborate experiments which are impracticable for a general study, but approximate results may be obtained from meteorological and hydrographical data. The precise formula employed will depend upon the size and shape of the water body in question, but for a shore such as the one under investigation the amount of wave energy expended at any

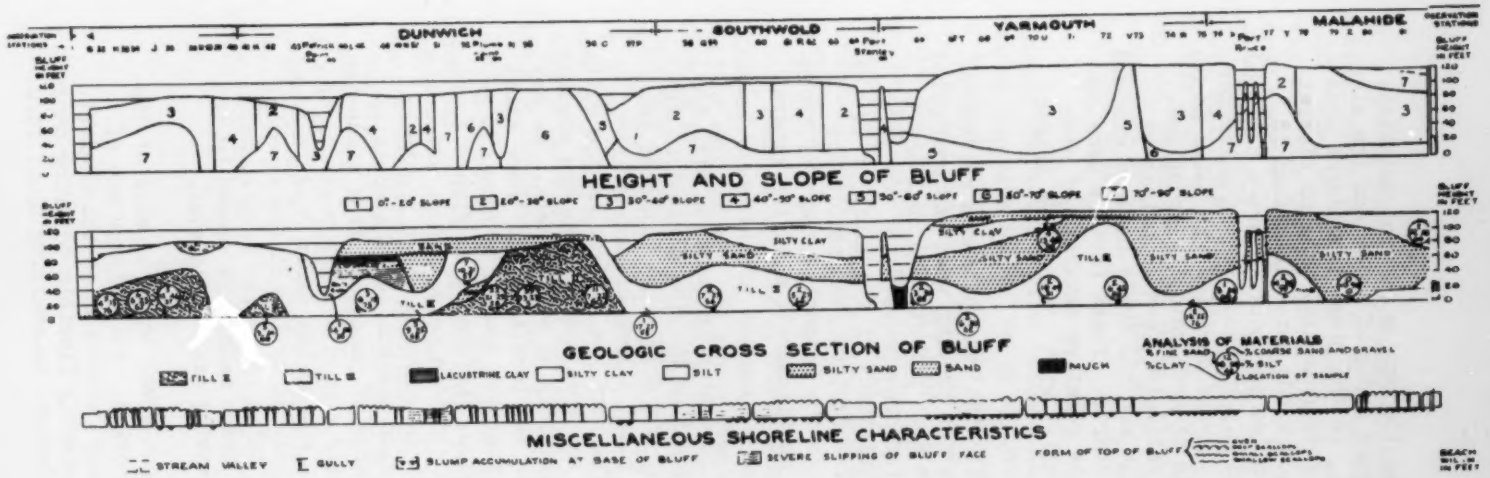
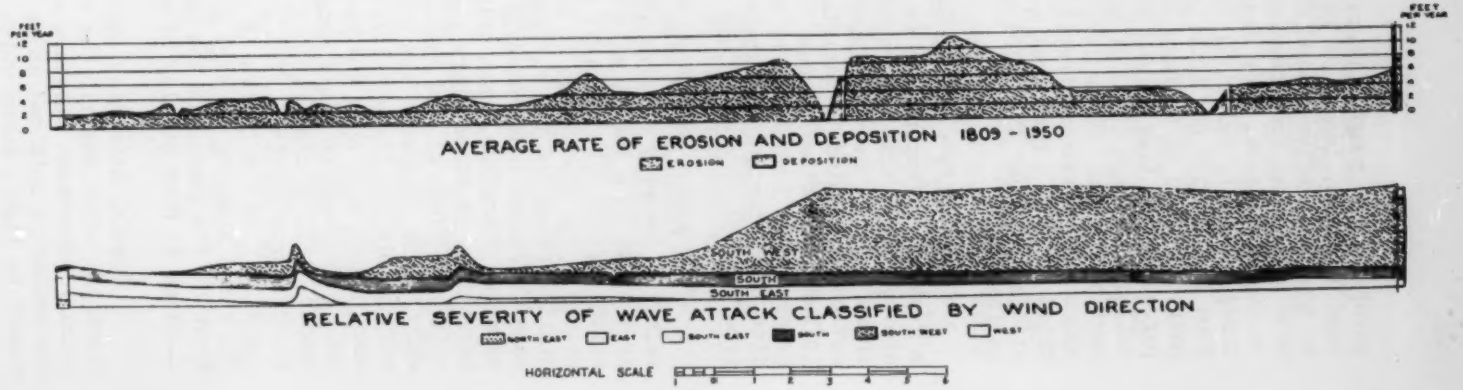

DUNWICH
SOUTHWOLD
YARMOUTH
MALAHIDE
HEIGHT AND SLOPE OF BLUFF
0°-20° SLOPE
20°-30° SLOPE
30°-40° SLOPE
40°-50° SLOPE
50°-60° SLOPE
60°-70° SLOPE
70°-90° SLOPE
GEOLOGIC CROSS SECTION OF BLUFF
TILL II
TILL III
LACUSTRINE CLAY
SILTY CLAY
SILT
SILTY SAND
SAND
MUCK
ANALYSIS OF MATERIALS
% FINE SAND
% COARSE SAND AND GRAVEL
% CLAY
% SILT
LOCATION OF SAMPLE
MISCELLANEOUS SHORELINE CHARACTERISTICS
STREAM VALLEY
GULLY
SLUMP ACCUMULATION AT BASE OF BLUFF
SEVERE SLIPPING OF BLUFF FACE
FORM OF TOP OF BLUFF

FIGURE-I


AVERAGE RATE OF EROSION AND DEPOSITION 1809 - 1950
EROSION
DEPOSITION
SOUTH WEST
SOUTH
SOUTH EAST
RELATIVE SEVERITY OF WAVE ATTACK CLASSIFIED BY WIND DIRECTION
NORTH EAST
EAST
SOUTH EAST
SOUTH
SOUTH WEST
WEST
HORIZONTAL SCALE

point will be roughly proportional to the square of wind velocity, wind duration, length of fetch, average depth of water and the sine of the angle between wind and shore. In the present instance wind data were taken from records of the meteorological station closest to the study area. For each direction winds were classified in three groups by velocity: from 0-12 miles per hour (average 6 m.p.h.); from 12-24 miles per hour (average 18 m.p.h.) and over 24 miles per hour, (assumed to average 30 m.p.h.). Wind duration was taken as the percentage of time during which winds of each velocity group prevailed. Average depth of water was estimated from soundings on nautical charts, while length of fetch and the angle between wind and shore were measured directly on the charts. These factors were combined to give a numerical index of the relative severity of wave attack which was then plotted in parallel with other shore characteristics.

When this index is compared with the rate of shore recession, a general correspondence is seen to exist proving what was postulated above, namely that wave attack is the most potent erosional agent. There remain, however, important differences between the two which may be attributed to variations in resistance of the bluff or to the influence of other forces. The precise factors responsible may generally be identified by reference to the composite chart of shoreline characteristics. There follows an illustration of the general type of deduction which may be made.

In Figure 2 the rate of shore recession is compared with the relative severity of wave attack, classified by wind direction. The area shown is a twelve mile section of the Erie shore centered two miles west of Port Stanley, at which place a long breakwater has caused local deposition to occur. Elsewhere the two graphs are quite similar except in the extremities of the area shown where the erosion rate increases independently of the severity of wave attack. We may surmise, therefore, that only in these two localities do there exist variations in other shore phenomena important enough to have a significant effect on the rate of recession. Reference to Figure 1, in which these phenomena are charted, should then reveal those which are responsible for the acceleration of shore retreat. Even a cursory examination will show the western erosion maximum to be associated with a decrease in bluff height, a change of materials from a massive, compact till to one which is more easily eroded and the presence of slumped promontories. The eastern maximum on the other hand is found where till in the bluffs is largely replaced by lacustrine material and where slumping is very active. A third important factor, not shown on the chart, is the paucity of beach materials caused by the blockage at Port Stanley of eastward moving sand and gravel.

Special attention has so far been given those aspects of the shoreline which explain the rate of erosion. While these are of primary importance they are not the only relationships which exist. The procedure outlined above is sufficiently flexible to bring many others to light, among which are the factors determining bluff form.

It is found, for example, that slumped promontories are only present where the rate of erosion is very high. Slipping of the bluff face, on the other hand, is associated with a moderate erosion rate and only occurs where there is much silt in the bluff. Scalloped indentations along the brow of the cliff are most fully developed where clay lies at or near the surface. Examples of this kind could be multiplied, but these will suffice to indicate the nature of the conclusions which may be reached. While these conclusions may not be universally true, the procedure followed permits such ready comparison of relevant data over the entire study area that validity for this area, at least, may be assured.

It is clear that an investigation of this nature cannot be considered complete. Other factors might be included: one which immediately suggests itself being an index of the protection given the bluff by beach deposits and of the greater vulnerability of the shore where beaches are absent. Unfortunately a number of difficulties attend the evaluation of this significant factor and no entirely satisfactory method has so far been worked out. It is to be hoped that this and other problems will be solved in the course of future study. Such refinement, while admittedly necessary, will not, however, alter the basic approach.

Summing up, the approach consists of three main states. The first of these is the systematic collection of data concerning the rate of erosion and all associated shoreline phenomena. The second step is graphic and entails the representation of all findings on one composite diagram, any disadvantage of complexity being compensated for by the convenience of ready reference. The third and final stage is a synthetic study of the chart produced in step two with the purpose of establishing any relationships existing between the various factors there presented and of determining the contribution made by each to the process of erosion as a whole.

In conclusion it may be noted that this procedure provides information which is sufficiently complete and detailed to be used as a basis for planning proposals. Recommendations may be made as to where control measures are feasible and what type of control devices will prove most effective in these areas. Where it is seen that erosion control cannot be economically justified, an indication may be given of the optimum human adjustment to the retreating shoreline. While geography as a discipline transcends the purely utilitarian, any investigation of a problem such as shore erosion can hardly be considered adequate unless it produces results which are of direct practical value.

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